REMARKS/ARGUMENT

This paper further responds to the issues raised in the Official Action of May 13, 2003 (paper No. 7) and expands upon applicant's Amendment and Response of August 28, 2003 which has been entered by virtue of a Request for Continued Examination (RCE) filed September 26, 2003. The Request for Continued Examination included with it a Request to Suspend Action for three months to allow this paper and attached evidence to be finalized and submitted.

New claims 27-39 are added. They relate to claims 23-26 and 8, 15-22, respectively. Independent claims 27-30 define the glass compositions as consisting essentially of the indicated ingredients and do not include HfO_2.

Attached is the Evidentiary Declaration of Mr. Kazuo Tachiwama made November 10, 2003, the substance and import of which are discussed in the remarks that follow.

Glass compositions generally and legal standards on which to base an "obviousness" rejection

The present invention is directed to an inorganic glass composition. Prior to explaining and demonstrating why the present invention is not obvious over Komorita et al JP 53-4023 alone, or Takahashi et al JP 54-90218 in view of Komorita et al JP 53-4023, applicant now explains specific characteristics with regard to an invention pertaining to an inorganic glass composition generally. By doing so, it will be clear that an invention of an inorganic glass composition is technically different from, for example, an invention of an organic polymer composition that can contain a variety of organic and inorganic compounds, and the explanation of this specific nature of glass compositions will serve to clarify the technical significance of the present invention to be explained later.

Inorganic glasses can be generally classified into oxide glasses and halide glasses. Of these, oxide glasses are composed of various metal oxides, in which the cation components are various metal cations and anion components thereof are oxide anions

(O^{2-}). Halide glasses are composed of various metal halides, in which the cation components are various metal cations and anion components thereof are fluorine anions (F^-) or chlorine anions (Cl^-).

As is clear from claims 23-30, the optical glass composition of the present invention is an inorganic oxide glass composed of various metal oxides.

In inventions of inorganic oxide glasses, the following should be specially emphasized. The metal oxides constituting the oxide glasses are limited -- the number of kinds of such metal oxides is about 20 at most. To produce oxide glasses capable of satisfying various intended properties it is necessary to select from this limited list of metal oxides.

In the oxide glasses composed of various metal oxides, the total amount of the metal oxides is naturally limited to 100 %. When an attempt is made to add a predetermined amount of a certain metal oxide for attaining a desired property, other existing (one or more) metal oxide(s) used to provide other property (properties) is (are) decreased in a corresponding amount. In this case, the entire glass composition becomes unbalanced, and no glass having intended properties can be obtained, as so often happens.

Further, if an attempt is made to decrease a certain metal oxide by a predetermined amount, one or more existing metal oxide(s) inevitably increase(s) by an amount equivalent to the amount decreased. In this case as well the entire glass composition is often unbalanced, and no glass having intended properties can be obtained, as so often happens.

Due to these practical constraints, it is general practice for experts in charge of the production of glass to select or reduce specific metal oxides from limited kinds of metal oxides, depending upon the types of oxide glasses desired, and repeatedly make trials and errors by relying on their experiences of many years and using their experience and intuition for obtaining a glass that satisfies various properties required in each case. Eventually, they finally find a suitable glass composition possessing the desired characteristics -- if their investigation is successful. Inventions relating to glass

compositions, including the present invention, have difficulties after considerable effort for these reasons.

The Official Action contains two rejections, both based upon prior art and both alleging obviousness of the involved claims. These rejections are flawed for at least two reasons: there is no teaching in the documents themselves to modify the applied references or combine the applied references and, even if combined or modified, there is no reasonable expectation of a successful result.

The U.S. Court of Appeals for the Federal Circuit has stated that "[t]he mere fact that the prior art may be modified in the manner suggested by the examiner does not make the modification obvious unless the prior art suggested the desirability of the modification." *In re Fritch*, 972 F.2d 1260, 1266, 23 USPQ2d 1780, 1784 (Fed. Cir. 1992) (citing *In re Gordon*, 733 F.2d 900, 902, 221 USPQ 1125, 1127 (Fed. Cir. 1984)). Although this statement is couched in terms of modifying the prior art, in May of this year the Board of Appeals and Interferences, in a non-precedential decision (67 USPQ2d 1633 at 1635) held that the mere fact that teachings found in the prior art could be combined as proposed by an examiner does not make the combination obvious "absent some teaching, suggestion or incentive supporting the combination." *Carella*, 804 F.2d at 140, 231 USPQ at 647 (citing *ACS Hosp. Syss., Inc.*, 732 F.2d at 1577, 221 USPQ at 933).

With regard to the Komorita reference, applied by itself (see pages 2-3 of paper no. 7), even when obviousness is based on a single prior art reference, there must be a showing of a suggestion or motivation to modify the teachings of that reference. *See B.F. Goodrich Co. v. Aircraft Breaking Sys. Corp.*, 72 F.3d 1577, 1582, 37 U.S.P.Q.2d 1314, 1318 (Fed. Cir. 1996).

The rejections and argumentation underlying these rejections is also not realistic having regard to the intricacies of this art. The rejections are attempted to be justified by the approach that simply changing one of the components will magically result in a suitable product and thereby describe or suggest the contents of the rejected claims. The

fact of the matter is, as explained in considerable detail above as well as in the attached Declaration, there is no realistic expectation of a successful result - nor is it likely that the result of the substitution or modification will result in a useful product or provide a glass composition having the properties and characteristics defined by applicant's claims. Indeed, this is confirmed by the evidence discussed below. The law is clear--there must be a reasonable expectation of success: *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991).

The arguments put forward in support of the two rejections appear to be based upon the notion that simply exchanging one oxide for another will automatically yield an acceptable result when, in fact, considerable trial and error (mostly error) is likely to result until a suitable glass composition possessing the desired properties is obtained.

Response to rejection of claims 8, 15-18 and 23-26
based on Komorita et al JP 53-4023

In the Amendment filed February 25, 2003, applicant has explained in detail that Komorita et al JP patent fails to anticipate[1] the present invention since they disclose HfO_2 which is not required in the present invention.

Responding to applicant's argument above, on page 5 of the Office Action dated May 13, 2003, the examiner states an opinion that the applicant's argument is not deemed persuasive because applicant's then present claims did not limit the amount of HfO_2 in the composition.

Applicant interprets the examiner's views (as stated above) that Applicant's argument would be persuasive if applicant's claims are drafted such that the composition contains no HfO_2. Bearing the examiner's comment in mind, in the amendment filed August 28, 2003, applicant added to the end of each of independent claims 23, 24, 25 and 26 a requirement that the optical glass does not contain HfO_2. This is implicit in

[1] The first Official Action applied this reference as anticipatory; the current Action applies it under 35 U.S.C. § 103(a).

applicant's disclosure as HfO_2 forms no part of applicant's inventive compositions. A similar result is obtained by the use of "consisting essentially of" in new claims 27-30.

In the outstanding Advisory Action, however, the examiner states that the recitation of the negative limitation of HfO_2 has not been considered before and therefore would require further search and consideration. Therefore, applicant requested Continued Examination (RCE). Amendment of the claims to include the limitation that the optical glass does not contain HfO_2 responds to the examiner's comment and thus overcomes the rejection directed to claims 8, 15-18 and 23-26. New claims 27-39 are similarly patentable.

The optical glass described in Komorita et al JP patent contains 0.1 to 25 % of HfO_2 as an essential component, and in Examples Nos. 1 to 44, various glasses containing HfO_2 in the range of 0.1 to 25 % are produced. The English translation of Komorita et al JP patent, page 4, line 3 (from the bottom) to page 5, line 4 discloses that HfO_2 is a particularly important component in their invention.

When one skilled in the art reads Komorita et al JP patent disclosing that HfO_2 is essential and important, this is certainly no suggestion that it might be possible for him or her to formulate a glass composition without HfO_2.

Assuming *arguendo* one might wish to omit HfO_2 from the glass composition described in Komorita et al JP patent, if he or she omits HfO_2 by its maximum amount or 25 %, it is necessary to increase one or more existing metal compounds by an equivalent amount (25 %), or the relative amount ratio of each of the remaining metal oxides inevitably increases, and a glass composition obtained as a matter of form may differ from the glass compositions of the present claims 23-30 in its compositional amount or ratio.

Therefore, it is neither reasonable nor technically realistic for the examiner to argue that the glass compositions of the present claims 23 to 30 can be obtained by merely omitting HfO_2 from the glass composition of Komorita et al JP patent.

Accompanying this response is the Evidentiary Declaration of the inventor explaining the procedures, compositions and experiments undertaken and comparing them to characteristics of claims 23-30.

The inventor, Kazuo TACHIWANA, has prepared a glass composition (identified as "potential glass composition of Komorita et al" hereinafter) based upon the glass composition of Komorita et al JP patent. That is, the potential glass composition of Komorita et al was the same as the glass composition in Example 6 of the present specification except that part (5.0 % by weight) of La_2O_3 whose content was the largest (41.8 % by weight) in the glass composition in Example 6 was replaced with HfO_2. After the replacement, the potential glass composition of Komorita et al still fully satisfied the compositional requirements of the present invention except for the presence of HfO_2. The inventor attempted to melt the potential glass composition of Komorita et al to form a glass and measure the glass for a refractive index (nd), an Abbe's number (vd) and a glass transition temperature (Tg). Table attached hereto shows the potential glass composition of Komorita et al containing 5 % by weight of HfO_2 together with the glass composition in Example 6 of the present specification.

However, when an attempt was made to form the potential glass composition of Komorita et al into a glass according to the method shown in the Table, it became devitrified during stirring as described in the Table, and the intended glass was not obtained. Hence, it was impossible to measure nd, vd and Tg.

The above experimental result proves the following: The glass composition of the present invention and the glass composition of Komorita et al JP patent, while having apparently similar compositions, depending upon the absence or presence of HfO_2, one glass composition gives the desired glass, and the other glass composition fails to give a glass itself.

Apart from the above information and data, the present invention provides considerable savings when contrasted with Takahasi. As compared with lanthium oxide, hafnium oxide is a very costly material indeed. See the attached copies of the relevant

pages of the 1993 Aldrich Handbook of Fine Chemicals and Laboratory Equipment. HfO_2 used as a glass component in the invention disclosed in Komorita et al JP 53-4023 costs 60,600 yen (=$500) per 5 grams reagent grade. In contrast, the present invention does not use any HfO_2 and uses La_2O_3 instead. The price of La_2O_3 reagent grade is 3,000 yen (=$28) per 5 grams; this price is about $1/20^{th}$. On the basis of these facts, it can be said that the present invention provides advantages over Komorita et al JP patent in price and industrial productivity.

In the Advisory Action (as to then pending claims 8 and 15-26), the examiner states that there "may be an issue of new matter because the negative limitation of HfO_2 is not supported in the specification." This is not so. Applicant is making explicit that which is already implicit, namely that the inventive compositions do not include HfO_2, as illustrated by the many glass compositions included in applicant's specification. HfO_2 is also excluded from new claims 27-39 in the definition of the composition.

Response to rejection of claims 8, 15-18, 24 and 26 based on Takahashi et al JP 54-90218 in view of Komorita et al JP 53-4023

In this rejection independent claims 23 and 25 are not rejected, only independent claims 24 and 26 are rejected. While Takahashi et al JP patent cited as a main reference describes a glass composition containing as much as 2 to 25 % by weight of WO_3 as an essential component, the glass compositions of the rejected claims 24 and 26 do not require WO_3 as an essential component.

As explained above, Takahashi et al JP patent discloses a glass composition containing 25 % by weight of WO_3 at most as an essential component, so that it can not constitute a stand-alone reference for denying the patentability of the present claims 24 and 26 directed to glass compositions that do not contain WO_3 as a main component.

Claims 24 and 26 are not suggested from Takahashi et al JP patent in view of Komorita et al JP patent. While the glass compositions of the present claims 24 and 26 contain 0.5 to 1.5 % by weight of Nb_2O_3 as an essential component, Takahashi et al JP patent as a main reference fails to disclose incorporation of Nb_2O_3 to their glass

composition. Due to this key deficiency, the examiner cites, as a secondary reference, Komorita et al JP patent disclosing a glass composition containing 0 to 20 % of Nb_2O_5 and argues that the glass compositions of the present claims 24 and 26 are obvious from Takahashi et al JP patent in view of Komorita et al JP patent. Applicant disagrees as there is no motivation to combine these citations.

Takahashi et al JP patent discloses a glass composition that does not contain HfO_2 as an essential component, nor do they describe that their composition contains HfO_2 as an optional component. By contrast, Komorita et al JP patent discloses a glass composition containing HfO_2 as an essential component, and in its English translation, page 4, line 3 (from the bottom) to page 5, line 4, they describe that the use of HfO_2 as a glass component is the largest feature of their invention.

The examiner would have Komorita's importance and use of HfO_2 "imported" into Takahasi's compositions when there is no reason in Takahasi to do so.

On one hand, Takahashi et al JP patent admits no significance of HfO_2, and on the other hand, Komorita et al JP patent admits an important significance of HfO_2. These two JP patents disclose glass compositions of different types, and there is no suggestion or reason (apart from hindsight) to combine these two JP patents.

The present claims 24 and 26 define the content of Nb_2O_5 as being 0.5 to 1.5 % by weight, while the content of Nb_2O_5 in Komorita et al JP patent is 0 to 20 % by weight. In other words, the Nb_2O_5 is an optional component which may or may not be present. In Examples 1 to 44 of Komorita et al JP patent, only the glass compositions in Examples 21 and 32 contain 20 % by weight (Example 21) or 10 % by weight (Example 32) of Nb_2O_5, and the glass compositions in the remaining 42 Examples are compositions containing no Nb_2O_5.

Komorita et al JP patent describes nothing concerning incorporation of Nb_2O_5 in a very small amount range of 0.5 to 1.5 % by weight, nor does it describe any Examples with regard to glass compositions containing 0.5 to 1.5 % by weight of Nb_2O_5.

Therefore, claims 24 and 26 directed to the glass compositions containing 0.5 to 1.5 % by weight of Nb_2O_5 as a glass component are in no way suggested from Takahashi et al JP patent in view of Komorita et al JP patent disclosing Nb_2O_5 as an optional glass component.

The examiner argues that Nb_2O_5 described in Komorita et al JP patent will be added to the glass of Takahashi et al JP patent. This is not the case. That is because the composition of a glass must contain no more than 100 % in total content, as explained above. Due to the specific nature of invention of glass compositions, if Nb_2O_5 is added to the glass of Takahashi et al JP patent, it is necessary to reduce some existing component(s)--which one or ones?--in an amount corresponding to the amount of the Nb_2O_5 added. In this case, the glass as a whole may get out of shape in balance.

Simply adding a given oxide such as Nb_2O_3 is not sufficient. To support such a rejection it must be demonstrated in the applied reference(s) which component or components are to be reduced and in what amount. Clearly a *prima facie* case of obviousness has not been established.

Table

	Glass composition of the present invention					Potential glass composition of Komorita et al
	Claim 23	Claim 24	Claim 25	Claim 26	Ex. 6	Ex. 6 (Part of HfO_2) replaced
SiO_2	6-9	6–9	6-9	6-9	6.7	6.7
B_2O_3	9–12	9–12	9–12	9–12	10.8	10.8
GeO_2	0–5	0–5	0–5	0–5	0	0
ZnO	0–15	0–15	1–7	1–7	4.5	4.5
La_2O_3	30–60	30–60	30–60	30–60	41.8	36.8
Gd_2O_3	0–30	0–30	0–30	0–30	9.6	9.6
Y_2O_3	0–10	0–10	0–10	0–10	3.8	3.8
Yb_2O_3	0–5	0–5	0–5	0–5	0	0
ZrO_2	2–8	2–8	2–8	2–8	5.2	5.2
Ta_2O_5	13–19	13–19	13–19	13–19	15.9	15.9
$SiO_2+B_2O_3+GeO_2$	16-19	16-19	16-19	16-19	17.5	17.5
B_2O_3+ZnO	9 or more	9 or more	12 or more	12 or more	15.3	15.3
$La_2O_3+Gd_2O_3+Y_2O_3+Yb_2O_3$	50–60	50–60	50–60	50–60	55.2	50.2
Total of the above components	95 or more	95 or more	95 or more	95 or more	98.3	98.3
Li_2O	0–3	0–3	0–3	0 – 3	0.2	0.2
$ZnO/(SiO_2+B_2O_3)$	0< -2	0< -2	-	-	0.26	0.26
$(La_2O_3+Gd_2O_3+Y_2O_3+Yb_2O_3)/(SiO_2+B_2O_3)$	2–4	2–4	-	-	3.15	2.87
$(ZrO_2+Ta_2O_5+Nb_2O_5)/(SiO_2+B_2O_3)$	1–2	1–2	-	-	1.28	1.28
Nb_2O_5	0-3	0.5-1.5	0-3	0.5-1.5	1.3	1.3
WO_3	0-1	-	0-1	-	0	0
Sb_2O_3	-	-	-	-	0.2	0.2
HfO_2	-	-	-	-	0	5
Total					100.0	100.0
Reproduction state					Glass formed	Devitrified during stirring
nd (Sp)*	1.875≤	1.875≤	1.875≤	1.875≤	1.88	-
nd (found)	-	-	-	-	1.88024	Unmeasurable*
vd (SP)*	39.5≤	39.5≤	39.5≤	39.5≤	40.9	-
vd (found)	-	-	-	-	40.99	Unmeasurable*
Tg(°C) (SP)*	700°C≥	700°C≥	700°C≥	700°C≥	672	-
Tg(°C) (found)	-				684.3	678
Method of glass production					Method**	

(Sp)* = Value in specification, Unmeasurable* = Unmeasurable due to devitrification, Method* = Powders as raw materials were fully mixed and then placed in platinum crucible. The Powders were melted in a furnace at 1,400°C, stirred and clarified, and then a molten glass was cast into a molding frame made of iron under heat at a proper temperature and held at a temperature near Tg for 2 hours and gradually cooled.

For the above reasons it is respectfully submitted that the claims of this application define inventive subject matter. Reconsideration and allowance are solicited.

Respectfully submitted,
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